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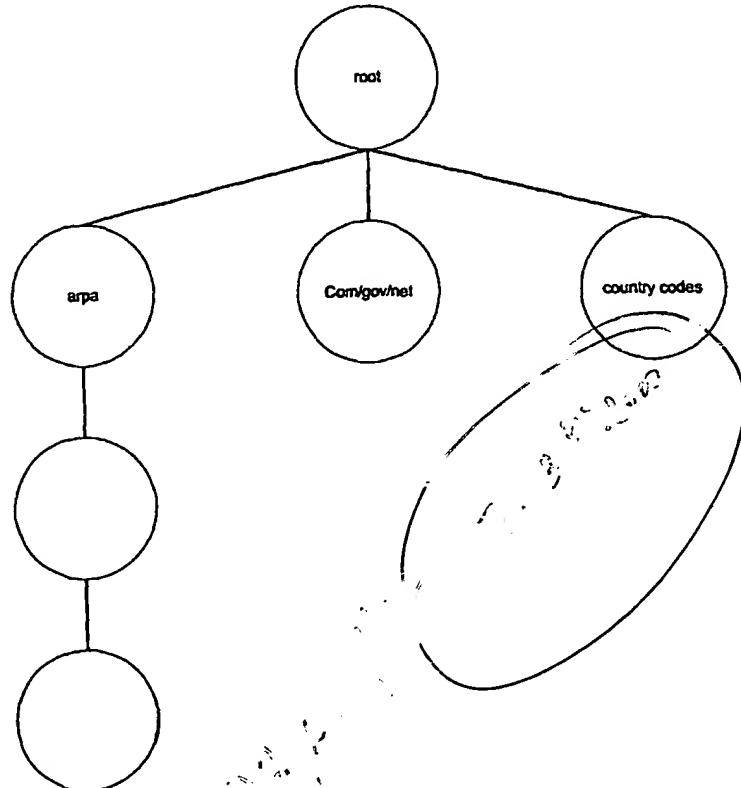
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(54) Title: DERIVATIVE DOMAIN NAMES



(57) Abstract: The disclosure describes methods, computer programs, and systems for handling domain name queries. The domain name queries can feature derivative domain names such as domain names including spaces.

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DERIVATIVE DOMAIN NAMES

Reference to Related Applications

This application claims priority for subject matter
5 disclosed in pending U.S. Provisional Application Serial No.
60/159,777, entitled "SYSTEMS AND METHODS FOR ALLOWING
EXTENDED DOMAIN NAME SPACES", which is incorporated by
reference in its entirety herein.

10 This application relates to U.S. Application Serial No.
_____, entitled "DOMAIN NAME SEARCHING", filed on the same
day as the present application, and incorporated by reference
in its entirety herein.

15 **Background**

The tremendous growth of the Internet has made quality
domain names a vanishing resource. As is generally known, a
domain name is an identifier that identifies a computer, or
group of computers, on the Internet. Typically, users try to
20 select a domain name that is easily remembered and somewhat
representative of the services provided by the computers
associated with the domain name. For example, the Boston
Globe has registered the domain name "Boston.com" for a set
of computers that offer a website having information about
25 current events in the Boston area.

Unfortunately, individuals that now wish to add a domain
to the Internet are confronted with the fact that simple and
descriptive domain names are now a rare commodity. The
tremendous growth of the Internet, and the coincident
30 increase in the number of domains that comprise the Internet,
has resulted in a depletion in the supply of simple and
descriptive domain names.

Additionally, as the importance of the Internet
continues to grow, those holders of quality registered domain

names now find themselves with valuable assets. To exploit the value of their domain name, many domain name holders sell their domain name to the highest bidder. This often results in the registered domain name holder being completely 5 divested of all rights in the domain name.

Summary

In general, in one aspect, the invention features a method for allowing a domain name holder to create a 10 sub-space of derivative domain names. The method includes allowing the registered holder of a domain name to designate a selected authoritative server for that domain name, allowing a third party to request an operator of the designated authoritative server to register a derivative 15 domain name that is to be associated with a network device or service chosen by the third party, and creating for the selected authoritative server a table of derivative domain names. Each derivative domain name including a primary domain name and being associated with a pointer to the 20 network device or service chosen by the third party.

Embodiments may include one or more of the following. Designating an authoritative name server may include transferring rights in the name to a trusted third party. The derivative domain names may include domain names 25 expressed in natural language or using characters from different character sets such as Unicode. The method may include use of a hierarchical security system.

In general, in another aspect, the invention features a computer-implemented method of processing a domain name 30 query. The method includes storing Internet Protocol addresses corresponding to respective derivative domain names, receiving a domain name query for a derivative domain name, and retrieving an Internet Protocol address corresponding to the received domain name query.

Embodiments may include one or more of the following. The derivative domain names may include at least one spaces between non-space characters. The derivative domain names may be encoded using at least two different character sets.

5 The domain names may be stored in a table. The method may also include receiving a derivative domain name and a corresponding Internet Protocol address for storage in the table. Such a method may include determining whether an entity submitting the derivative domain name and

10 corresponding Internet Protocol address is authorized to store the derivative domain name in the table. The method may also include determining whether an entity attempting to access the table has authorization. The method may include storing Internet Protocol addresses corresponding to non-

15 derivative domain names. The method may also include transmitting the retrieved Internet Protocol address over a network to an entity requesting processing of the domain name query.

In general, in another aspect, the invention features a

20 computer program product, disposed on a computer readable medium, for causing a processor to store Internet Protocol addresses corresponding to respective derivative domain names, receive a domain name query for a derivative domain name, and retrieve an Internet Protocol address corresponding

25 to the received domain name query.

In general, in another aspect, the invention features a

method of doing business that includes registering a domain name and licensing one or more derivative domain names including the registering domain name without licensing the

30 registered domain name.

Brief Descriptions of the Drawings

Fig. 1 is a diagram of the hierarchical structure of the Domain Name Space;

5 Fig. 2 is a block diagram of a system for allowing a domain name holder to create a sub-space of domain names; and

Fig. 3 is a flow chart of a process for allowing a registered domain name holder to provide a domain sub-space to a third party user.

10

Detailed Description

To provide an overall understanding, certain illustrative embodiments will now be described, including a method that allows a domain name holder to create a space of sub-domains that maybe licensed or otherwise granted to one 15 or more third parties. Additionally, the disclosure describes a name server that is capable of creating a sub-space of domain names for a registered domain space. The sub-space may include domain names in a wide variety of languages, character sets, and forms. Moreover, it will be 20 understood by one of ordinary skill in the art that the systems and methods described herein maybe adapted and modified to provide search systems, including search systems that may process a requested domain name to provide a list of sub-domains associated with that domain name, or for any 25 other suitable application. Other additions and modifications can be made to the invention without departing from the scope hereof.

In one particular embodiment, domain name holders can leverage the present architecture of the Internet, or a 30 similar computer network, to allow a holder of a registered domain name to create a sub-space of derivative domain names and license, sell, share, or assign the sub-space, or portions of the sub-space, to third parties. By way of background, it is generally known that the identity of a

computer on the Internet is given by a binary address. A common notation for representing the binary address depicts the address as a series of numbers such as 198.203.55.175. However, as it is unrealistic to ask a user to remember a computer by its numeric address, the Internet provides a system, the domain name system (DNS), that allows a user to employ a domain name, such as "nametree.com," to refer to a host computer. To achieve this, the DNS acts as a distributed database that can resolve a domain name, like nametree.com, into an associated Internet address, such as 198.203.55.175.

As tens of thousands of domain names exist, the DNS system employs a hierarchical structure to support the translation service. As shown in Fig. 1, the DNS hierarchical structure has an unnamed root directory ("root") with a well-known address. The level immediately below the root of the Internet DNS includes a number of top level domains ("tld-s") including the ARPA domain; generic or organizational domains, such as com, edu, and gov; and a country or geographical group of domains that includes a set of two character country codes.

The Internet DNS distributes responsibility for maintaining the DNS database across different servers. These different servers have responsibility for resolving different types of domain names. For example, the root directory may pass a domain name query for a ".com" domain name to the server responsible for translating ".com" domain names. Similarly, these second level servers may identify the appropriate name server for a particular domain being sought. To this end, a name server can examine an incoming name query to determine whether that server has authority, or is the authoritative server, for the specified domain. To accomplish this, the name server can parse the domain name, for example, to identify the label that occurs to the left of

the tld. For example, the name server may parse the domain name "nametree.com" to identify the tld ".com" and the preceding label "nametree." If the preceding label indicates a domain over which that server has authority, the 5 server translates the name into an IP address, using the local name server database, and sends the answer to the client.

When the contacted server in a zone cannot resolve a domain name, the server's response depends on the type of 10 query sent by the resolver. Resolvers typically request a domain name translation in one of two ways. First, the resolver may ask the server to perform the complete translation. This is deemed a recursive resolution. If the client requests recursive resolution and the server cannot 15 resolve the name, the server will contact a domain name server that may resolve the domain name and return the answer to the client. Alternatively, resolvers may also request an iterative resolution of a domain name. A request for an iterative resolution tells the server to either resolve the 20 name or tell the client which server to contact next. In this case, the contacted server does not handle the complete resolution for the client. A further description of the Internet DNS is set forth in Jamsa et al., Programming for the Internet, Jamsa Press (1996).

25 With either type of resolution process, it is generally required that an authoritative server be identified for each domain name. Typically, upon registration of a domain name, the registered name holder identifies an authoritative server that may resolve the IP address for that domain. By making 30 this requirement, a user can be assured that at least one name server on the Internet will be capable of resolving a name query for any registered domain name.

As the Internet generally requires that an authoritative server be identified for each registered domain, it is a

realization of the present invention that by extending the capabilities of a designated authoritative server, a subspace of domain names maybe created wherein each domain name within this subspace is a derivative of a primary domain name 5 resolved by the authoritative server. As quality domain names have become a scarce and valuable resource on the Internet, such an authoritative server maybe employed for allowing a registered domain name holder to create a licensing program wherein rights to domain names that derive 10 from the registered domain name maybe licensed to third parties for their use.

One such system is depicted in Fig. 2 which shows a functional block diagram of a domain name server system 10 that forms a distributed database with an authoritative name 15 server 18 capable of parsing a name query for a derivative domain name to identify a host address associated with that derivative domain name. More specifically, Fig. 2 depicts a system 10 that includes a browser machine 12, a root name server 14, an authoritative server 18, having a primary and a 20 secondary name server, servers 20 and 22 respectively, and a target machine 24.

The browser machine 12, and each of the servers, may comprise conventional data processing platforms, such as IBM PC-compatible computers running the Windows operating 25 systems, or a SUN workstation running a version of the Unix operating system. The browser machine 12 maybe running an Internet browser program, such as the Netscape Navigator browser program, the Microsoft Internet Explorer program, the Lynx browser program or any other suitable browser program. 30 Although the depicted system 10 is described with reference to a browser operating with an Internet DNS system, it will be understood by those of ordinary skill in the art that the systems and methods described herein can also work with other types of client applications that request a name server to

resolve the IP address for a domain name, as well as with other types of networks including intranets, extranets, and any other suitable network.

Fig. 2 further depicts that the system 10 includes a 5 root level name server 14 that can be, for example the root level Internic name server which is capable of receiving from the browser machine 12 a name query representative of a request to resolve a domain name into an Internet address. The root name server 14 resolves a name query to identify a 10 second tier name server, such as the depicted authoritative name server 18, that has responsibility for resolving the domain name carried within the name query. The structure of the authoritative name server 18 can vary from the server 18 shown. The authoritative name server 18 may be authoritative 15 for sub-domains, but not necessarily for the domain name. Other architectures and designs can be employed without departing from the scope of the invention.

As further shown by Fig. 2, the root level name server 14 may respond to a name query from the browser machine 12 by 20 transmitting a response that indicates where the authoritative server 18 for the domain name is located. The browser machine 12 may then employ this information to request the authoritative server 18 to resolve the domain name into an Internet address. In the depicted example 25 system 10, the authoritative server 18 may resolve all name queries that end in the registered domain name, "nametree.com." Thus, any name query that includes the domain name "nametree.com", such as for example "People at nametree.com", or "Products from nametree.com" will be 30 forwarded to the authoritative server 18 to be resolved thereby.

The depicted authoritative server 18 is capable of parsing a domain name to identify an extension to the domain name that precedes the domain name within the name query.

For example, the authoritative server 18 may parse a complex domain name such as "people at nametree.com" to identify the terms and white space that may occur within any phrase that immediately preceded the domain name, "nametree.com."

5 Accordingly, the authoritative name server 18 of the invention allows the resolution of complex, or derivative, domain names wherein the domain name requested by the client machine 12 may include a primary domain name such as "nametree.com" or "boston.com" as well as further labels that 10 precede the primary domain name.

To this end, the authoritative server 18 may include a primary name server 20 and a secondary name server 22 that may act as conventional name servers capable of resolving domain names for the zone of responsibility for that 15 authoritative server 18. Additionally, however, the authoritative server 18 is also capable of accessing a database 28 that can store information about derivative domain names as well as the IP addresses to which these domain names can map. For example, the database 28 may store 20 derivative domain names and associated IP addresses such as those depicted in Table I.

TABLE I

Holiday Inns in Boston.com	198.102.33.444
Cinema 5 in Boston.com	198.222.34.909
Restaurants in Boston.com	298.345.23.232
Directory of Boston.com	134.222.34.345

25 Again, as shown in FIG. 1, a derivative domain name may include one or more spaces in between non-space characters. Since such domain names do not follow the traditional syntax of DNS domain names, traditional name servers may handle receipt of such domain names unpredictably.

As shown in Fig. 2, the database 28 may couple to the authoritative name server 18 to act as a supplemental database. Additionally, the database 28 may couple to a work station 26 wherein an operator can supplement, modify, or 5 otherwise work with the contents of the database 28. The database 28 may provide or distribute to other servers portions of the data. These portion can correspond to sub-domains or other logical structures. Additionally, entities, such as individuals and companies, can register sub-domains. 10 The design of such a system follows from principles known in the art, and various embodiments, including appropriate additional features can be added to the system without departing from the scope of the invention.

The authoritative server 18 maybe capable of parsing 15 different types of derivative domain names including derivative domain names that include Unicode characters, kanji characters, Cyrillic characters, or any other type of characters. Additionally, the authoritative server 18 maybe capable of parsing derivative domain names that are formed as 20 natural language statements, such as, for example, derivative domain names that employ white spaces or multiple white spaces for separating the labels within the derivative domain name. Other types of derivative domain names may also be parsed by the systems described herein without departing from 25 the scope of the invention. As further shown by TABLE I, each of the derivative names within the database 28 maybe associated with an IP address. The IP addresses can reference one or more host computers that are owned or operated by third parties that have licensed or otherwise 30 received the right to use the primary domain name as part of their derivative domain name. Alternatively, the IP addresses may point to host computers or other resources.

In one practice, the database 28 may store entries, such as the entry "Directory of Boston.com", that links to a

service or other resource that provides information about all, or portions, of the other derivative domains associated with the primary domain. Thus, a query for "Directory of Boston.com" can retrieve a link to a web server that provides 5 a web page that describes or identifies the derivative domains under the primary domain Boston.com. Accordingly, in one embodiment the systems described herein may include search engine systems that allow users to search through the data of the central registry, or portions of the central 10 registry, to allow a user to identify domains or sub domains that are include a keyword or phrase, or that relate to a certain IP address. Such a search engine may allow for a user to employ Boolean logic operators to form complex user queries for retrieving domain names or sub-domain names that 15 include certain patterns of text, numbers, kanji, Unicode, or other atomic unit of an extant domain or sub-domain name.

In a further embodiment, the systems described herein can include a security or control system that provides a hierarchical structure of authority to the domain space, or 20 portions of the domain space. For example, in some embodiments, the system may include a hierarchical control structure that requires a user to enter a password before the structure of a sub-domain can be altered. In this example system, the user can be provided a login page that allows the 25 user to enter a username and password. The security system can determine an authority level for that user given that password, and provide for that user a predetermined level of authority that allows the user to change portions of the structure of the defined domain space or to view or alter 30 certain sub-domains within the defined domain space. In one such implementation, the system will employ a username and password to identify a portion of the defined domain space that can be altered or viewed or otherwise accessed by the user. The system may operate similar to a Unix file system,

that may mount, in response to the username and password entered by the user, a portion of a directory structure into an existing file system, which can be generally available to all users. The mounted portion maybe viewed and accessed by 5 the user, or perhaps just viewed, depending on the level of authority granted to the user.

In addition to translating derivative domain names into corresponding IP addresses, the name server may also interpret aspects of the derivative domain names as 10 instructions for the domain name server.

Fig. 3 depicts one process for allowing a person to register a domain name and then allow the registered domain name to be employed by third parties that wish to create derivative domain names that maybe resolved by an 15 authoritative server such as the authoritative server 18 described above. The process 30 depicted in Fig. 3 begins when a user registers 32 a domain name. The processes for registering a domain name are well known in the art and any suitable process maybe practiced with the present invention 20 without departing from the scope hereof. After registration 32, the nameholder designates 34 an authoritative server. The designated authoritative server is the server that is understood by the Internet DNS system, or any other system that is being employed for resolving a name to a computer 25 address, as the server that is responsible for being able to resolve the domain name into a suitable computer address. In some practices, to increase reliability, the process may allow the registered name holder to transfer ownership for the domain name to a trusted party, or to an escrow agent, 30 that will be charged with maintaining the server 18 as the recorded authoritative server for the registered domain name. The domain name registered may be published 38 for third parties to view and consider using as a primary domain name for a derivative domain name of interest to the third party.

The third party can then register 40 a derivative domain name based on one of the published available domain names. The registration process employed in 40 maybe similar to the process employed in 32, however it will be understood that 5 the registered derivative domain name may employ characters and a format that the Internet DNS system may be incapable of resolving but that the authoritative server 18 would be capable of resolving.

Upon registration of the derivative name, an entry 10 representative 42 of the derivative name and an associated IP address is entered into a table that maybe stored within a database such as the database 28 depicted in Fig. 2. Once the entry is created within the table the process 30 may proceed to 44 wherein conventional Internet domain names are 15 resolved by the primary and secondary servers 20 and 22 respectively of the authoritative server 18. Derivative domain names may also be resolved by the authoritative server 18 through access to the database 28 depicted in Fig. 2. In this way, the authoritative server 18 may function both as a 20 conventional authoritative server 18 suitable for use with a typical domain name system as well as an authoritative server that is capable of resolving derivative domain names such as those described above and other similar types of derivative domain names.

25 The systems and processes described herein are merely examples of the types of systems and processes that can be implemented according to the invention. These systems can be implemented as C language computer programs, or as computer programs written in any high level language including C++, 30 Fortran, Java or basic. The development of such systems arises from principles well known in the art including those set forth in, for example, Stephen G. Kochan, *Programming in C*, Hayden Publishing (1983). Those skilled in the art will know or be able to ascertain using no more than routine

experimentation, many equivalents to the embodiments and practices described herein. For example, the systems of the invention can be provided as development systems for allowing users to develop their own systems for distributing rights in a domain name. Similarly, the business practices described herein can include practice for establishing domain name franchises. Accordingly, it will be understood that the invention is not to be limited to the embodiments disclosed herein, but is to be understood from the following claims, 10. which are to be interpreted as broadly as allowed under the law.

I claim:

1. A method for allowing a registered domain name
5 holder to create a sub-space of derivative domain names,
comprising:

allowing the registered holder of a domain name to
designate a selected authoritative server for that domain
name,

10 allowing a third party to request an operator of the
designated authoritative server to register a derivative
domain name that is to be associated with a network device or
service chosen by the third party, and

15 creating for the selected authoritative server a table
of at least one derivative domain name, wherein each
derivative domain name includes the primary domain name and
is associated with a pointer to the network device or service
chosen by the third party.

20 2. A method according to claim 1, wherein designating
an authoritative name server may include transferring rights
in the name to a trusted third party.

3. A method according to claim 1, wherein the selected
25 authoritative name server comprises a natural language name
server process capable of parsing natural language name
queries to identify a computer system associated with that
natural language domain name.

30 4. A method according to claim 1, wherein the selected
authoritative name server comprises a name server capable of
parsing domain name queries that include characters from
different character sets.

5. A method according to claim 4, wherein the different character sets include Unicode.

6. A method according to claim 1, wherein the selected 5 authoritative name server is capable of parsing a name query to identify an instruction carried within the name query and capable of directing the operation of the authoritative name server.

10 7. A method according to claim 1, further comprising implementing a hierarchical security system for determining access rights to the table.

15 8. A method according to claim 1, further comprising searching for domain names, or sub-domain names, that include a specified character pattern.

9. The method of claim 1, wherein the pointer comprises an IP (Internet Protocol) address.

20 10. A computer-implemented method of processing a domain name query, the method comprising:

storing Internet Protocol addresses corresponding to respective derivative domain names;

25 receiving a domain name query for a derivative domain name; and

retrieving an Internet Protocol address corresponding to the received domain name query.

30 11. The method of claim 10, wherein at least one of the derivative domain names including at least one space character between non-space characters.

12. The method of claim 11, wherein the derivative domain names comprise domain names encoded using at least two different character sets.

5 13. The method of claim 10, wherein storing comprises storing in a table.

14. The method of claim 10, further comprising receiving a derivative domain name and a corresponding
10 Internet Protocol address for storage in a table.

15. The method of claim 14, further comprising determining whether an entity submitting the derivative domain name and corresponding Internet Protocol address is
15 authorized to store the derivative domain name in the table.

16. The method of claim 14, further comprising determining whether an entity attempting to access the table has authorization.

20

17. The method of claim 10, further comprising storing Internet Protocol addresses corresponding to non-derivative domain names.

25 18. The method of claim 10, further comprising transmitting the retrieved Internet Protocol address over a network to an entity requesting processing of the domain name query.

30 19. A computer program product, disposed on a computer readable medium, the computer program including instructions for causing a processor to:

store Internet Protocol addresses corresponding to respective derivative domain names;

receive a domain name query for a derivative domain name; and

retrieve an Internet Protocol address corresponding to the received domain name query.

5

20. The computer program of claim 19, wherein at least one of the derivative domain names including at least one space character between non-space characters.

10 21. The computer program of claim 19, wherein the derivative domain names comprise domain names encoded using at least two different character sets.

15 22. The computer program of claim 19, wherein the instructions that cause the processor to store comprise instructions for causing the processor to store in a table.

20 23. The computer program of claim 19, further comprising instructions for causing a processor to receive a derivative domain name and a corresponding Internet Protocol address for storage in the table.

25 24. The computer program of claim 23, further comprising instructions for causing the processor to store Internet Protocol addresses corresponding to non-derivative domain names.

30 25. The computer program of claim 19, further comprising instructions for causing the processor to transmit the retrieved Internet Protocol address over a network to an entity requesting processing of the domain name query.

26. A method of doing business, the method comprising: registering a domain name;

licensing one or more derivative domain names including the registering domain name without licensing the registered domain name.

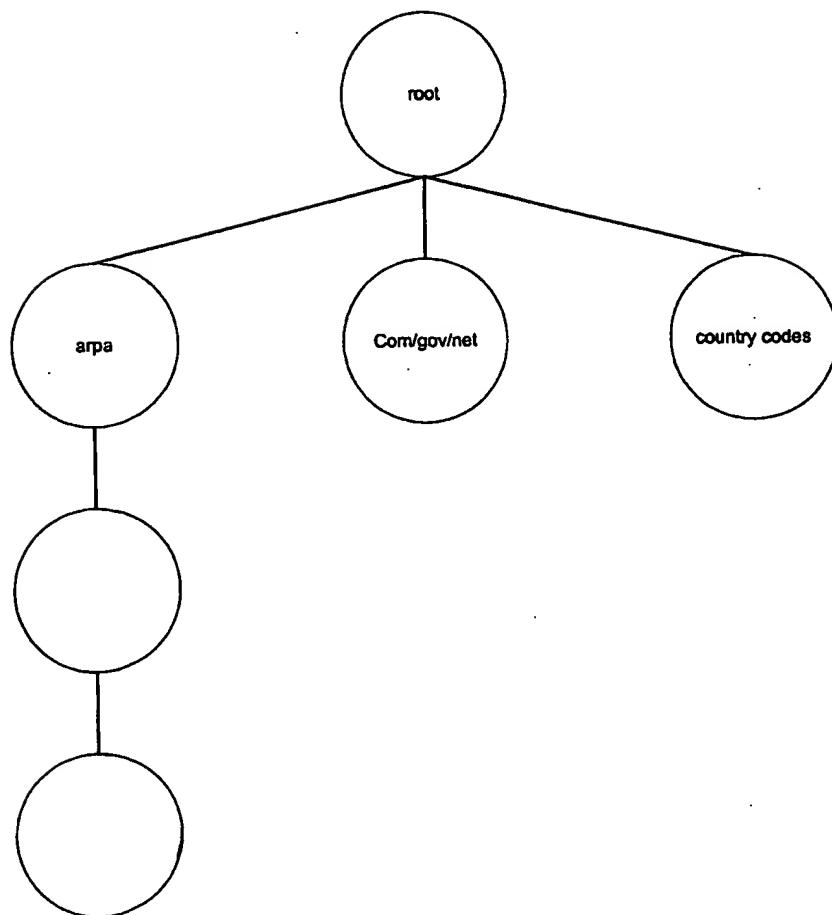
FIG. 1

FIG. 2

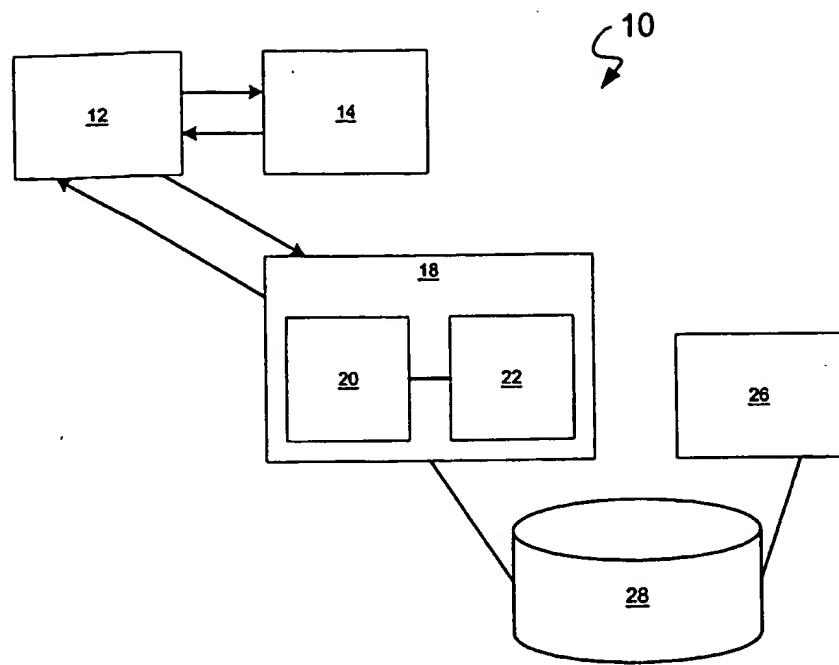


FIG. 3